

Remarks

We appreciate the Examiner pointing out the mistake in the dependencies of claims 17-20. The dependencies have been corrected. In claim 16, we have amended “a manganese dioxide” to “manganese dioxide or non-stoichiometric manganese dioxide” as described in the specification (the substitute specification filed on November 12, 2001) on page 23, first full paragraph (lines 10-18). We have added claim 21 to specify that the metal substrate is a motor vehicle radiator, with support being found throughout the substitute specification, including page 83, lines 20-24.

We believe that many, if not all, of the claim rejections may be due to a discrepancy in the specifications being utilized by the Applicants and the Examiner. Note that a substitute specification had been filed on November 12, 2001, and all of the specification references in the previous amendment are based upon that substitute specification. Accordingly, we respectfully submit that the pending claims 16-20 are supported under §112 on page 83, lines 20-27 of the substitute specification:

We have found that the use of *clay* minerals in *manganese dioxide* catalyst slurries unexpectedly improves the adhesion of the resulting catalyst coatings to *metal surfaces* including aluminum auto radiator fin surfaces. In contrast, coatings prepared without the clay suffer from a severe loss of adhesion. The loss in adhesion is believed to result from the catalytic decomposition of the *organic* acrylic-based polymer.

(emphasis added). Page 23, lines 10-19 of the substitute specification defines “manganese dioxide” as including non-stoichiometric manganese dioxide compounds:

Ozone treating catalyst compositions comprise manganese compounds including manganese dioxide, including non stoichiometric manganese dioxide (e.g., $\text{MnO}_{(1.5-2.0)}$), and/or Mn_2O_3 . Preferred manganese dioxides, which are nominally referred to as MnO_2 have a chemical formula wherein the molar ratio of manganese to oxide is about from 1.5 to 2.0, such as Mn_8O_{16} . Up to 100 percent by weight of manganese dioxide MnO_2 can be used in catalyst compositions to treat ozone.

Since the Office action states that “those portions of the specification [quoted above] do not allude to, let alone describe, a structure comprising a mixture coated on a metal substrate, wherein the mixture comprises a manganese dioxide, an organic binder and a clay,” we suspect that the Examiner may have been referencing the original specification, not the substitute specification, when checking the specification references cited in the previous response for support of claims

16-20. In any event, we respectfully submit that the specification provides §112 support for claims 16-20, as evidenced by the specification passages quoted above.

We respectfully submit that the claimed invention patentably distinguishes over the references cited in the Office action, specifically, DE 40 07 965 A1 (DE '965) in view of U.S. Patent No. 2,929,436 to Hampshire (Hampshire) and U.S. Patent No. 4,673,594 to Smith (Smith) and, in the case of claim 17, further in view of the various adhesives books cited. Unlike anything taught or suggested in the cited references, Applicants have discovered that the use of clay minerals in manganese dioxide catalyst slurries containing an organic binder unexpectedly improves the adhesion of the resulting catalyst coatings to metal substrates. Applicants have provided empirical evidence of this surprising result: see Example I(B) on pages 87-89 of the substitute specification, especially the table on page 89, which shows reduced coating loss (i.e., improved adhesion) with increasing clay (ATTAGEL® 50) content in manganese dioxide catalyst slurries containing an organic binder (RHOPLEX® P-376 binder); see also Example II on pages 90-91 of the substitute specification, especially the table on page 91, which shows significantly reduced coating loss when clay (ATTAGEL® 50) is incorporated into a manganese dioxide catalyst slurry containing an organic binder (RHOPLEX® P-376 binder). The clay counters the adhesion loss believed to be caused by degradation of the organic binder by a manganese dioxide (see page 83, lines 24-27 of the substitute specification).

We further respectfully submit that, with respect to new claim 21, one of ordinary skill would have incentive to avoid the use of clay as taught in Smith in the radiator application taught in DE '965). While the "tacky characteristic" said to be imparted by clay as disclosed in Smith (column 2, lines 55-57) might be beneficial for adhering insulating refractory fibers to a furnace wall, it would be problematic for the significantly different application of adhering non-fibrous catalyst material (in the form of "bulk catalyst, spheres, granules or pellets" as described on page 3, paragraph 2 of DE '965) to automobile radiators as disclosed in DE '965. This is because the tackiness of the coating could cause debris from the road and/or airborne sources to adhere to the radiator, thereby impeding or blocking air flow and diminishing the ability of the radiator to dissipate heat. As engine cooling is the critical function of automobile radiators, the reduction in cooling efficiency caused by adhered debris could potentially cause severe engine damage. Accordingly, the use of a "tacky" coating on an automobile radiator would not be advised by those of ordinary skill in the art.

In light of the foregoing, we respectfully submit that the claims, as amended, define a novel and non-obvious invention that fully merits patent protection. Accordingly, we respectfully request that the entire application be allowed at an early date. If there remain any issues that the Examiner believes can be resolved through discussion, we cordially invite the Examiner to contact Applicants' representative at the phone number provided below.

This response is being filed after five months but before six months after the March 2, 2004 date of the outstanding Office action. Authorization to charge the fee required for a three-month extension for response, as well as any other fee deemed to be required, to deposit Account No. 05-1070 is hereby granted.

Respectfully submitted,



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